CLAIMS

What is claimed is:

1. In a communications system having a modem pool for communicating via a communications channel, the modem pool comprising a plurality of modems and having a plurality *A* of NEXT cancellation filters, a method for NEXT cancellation filter allocation comprising the steps of:

a) measuring NEXT impairment caused to at least one target modem among said plurality of modems by at least one disturber modem among said plurality of modems;

b) allocating *P* filters among said *A* filters as probe filters, where $P>=1$;

c) allocating at least one of the remaining *A-P* filters among said filters to cancel NEXT from at least one disturber modem among said plurality of modems; and

d) measuring, using at least one of said *P* probe filters, NEXT impairment caused to at least one target modem among said plurality of modems by at least one candidate disturber modem among said plurality of modems to which no *A-P* filter is currently allocated.

2. A method according to claim 1 and further comprising:

e) reallocating at least one currently allocated one of said *A-P* filters to said *P* probe filters.

3. A method according to claim 2 wherein said reallocating step e) comprises reallocating if the NEXT impairment caused by said candidate disturber modem is greater than the NEXT impairment caused by any other disturber modem among said plurality of modems to which an *A-P* filter is currently allocated.

4. A method according to claim 1 wherein said measuring step comprises measuring said NEXT impairment as the absolute sum of all NEXT cancellation filter coefficients of said filters.

5. A method according to claim 1 wherein said allocating step c) comprises allocating in order of NEXT impairment from greater impairment to lower impairment.

6. A method according to claim 1 wherein said allocating step comprises allocating any of said filters to only one of said modems.

7. A method according to claim 2 wherein said reallocating step comprises reallocating any of said filters to only one of said modems.

8. A method according to claim 1 wherein said allocating step comprises allocating any of said filters to at least two of said modems at different times.

9. A method according to claim 1 wherein said reallocating step comprises reallocating any of said filters to at least two of said modems at different times.

10. A method according to claim 2 and further comprising:

f) measuring said target modem's signal-to-noise ratio (SNR) prior to said allocating step b); and

g) measuring said target modem's SNR once said probe filter has reached convergence,

and wherein said reallocating step e) is performed if said SNR measured in step g) is greater than said SNR measured in step f).

11. A method according to claim 2 and further comprising:

f) measuring said target modem's signal-to-noise ratio (SNR) and data rate prior to said allocating step b); and

g) measuring said target modem's SNR once said probe filter has reached convergence; and

h) estimating said target modem's data rate based on said SNR measured in step g),

and wherein said reallocating step e) is performed if said data rate estimated in step h) is greater than said data rate measured in step f).

12. A method according to claim 11 wherein said estimating step h) is performed if said SNR measured in step g) is greater than said SNR measured in step f).

13. A method according to claim 1 wherein said plurality of modems number at least one more than said plurality of NEXT cancellation filters.

14. A communications system comprising:

a modem pool for communicating via a communications channel, said modem pool comprising a plurality of modems and a plurality *A* of NEXT cancellation filters, said modem pool being operative to:

a) measure NEXT impairment caused to at least one target modem among said plurality of modems by at least one disturber modem among said plurality of modems;

b) allocate P filters among said A filters as probe filters, where $P>=1$;

c) allocate at least one of the remaining A-P filters among said filters to cancel NEXT from at least one disturber modem among said plurality of modems; and

d) measure, using at least one of said P probe filters, NEXT impairment caused to at least one target modem among said plurality of modems by at least one candidate disturber modem among said plurality of modems to which no A-P filter is currently allocated.

15. A system according to claim 14 wherein said modem pool is additionally operative to:

e) reallocate at least one currently allocated one of said A-P filters to said P probe filters.

16. A system according to claim 14 wherein said modem pool is additionally operative to reallocate if the NEXT impairment caused by said candidate disturber modem is greater than the NEXT impairment caused by any other disturber modem among said plurality of modems to which an A-P filter is currently allocated.

17. A system according to claim 14 wherein said modem pool is operative to measure said NEXT impairment as the absolute sum of all NEXT cancellation filter coefficients of said filters.

18. A system according to claim 14 wherein said modem pool is operative to allocate any of said A-P filters in order of NEXT impairment from greater impairment to lower impairment.

19. A system according to claim 14 wherein said modem pool is operative to allocate any of said filters to only one of said modems.

20. A system according to claim 14 wherein said modem pool is operative to reallocate any of said filters to only one of said modems.

21. A system according to claim 14 wherein said modem pool is operative to allocate any of said filters to at least two of said modems at different times.

22. A system according to claim 14 wherein said modem pool is operative to reallocate any of said filters to at least two of said modems at different times.

23. A system according to claim 15 wherein said modem pool is operative to:

f) measure said target modem's signal-to-noise ratio (SNR) prior to performing said allocating step b); and

g) measure said target modem's SNR once said probe filter has reached convergence, and perform said reallocating step e) if said SNR measured in step g) is greater than said SNR measured in step f).

24. A system according to claim 15 wherein said modem pool is operative to:

f) measure said target modem's signal-to-noise ratio (SNR) and data rate prior to performing said allocating step b); and

g) measure said target modem's SNR once said probe filter has reached convergence; and

h) estimate said target modem's data rate based on said SNR measured in step g),

and perform said reallocating step e) if said data rate estimated in step h) is greater than said data rate measured in step f).

25. A system according to claim 24 wherein said modem pool is operative to perform said estimating step h) if said SNR measured in step g) is greater than said SNR measured in step f).

26. A system according to claim 14 wherein said plurality of modems number at least one more than said plurality of NEXT cancellation filters.